Journal of Forensic and Legal Medicine 20 (2013) 740–746

Contents lists available at SciVerse ScienceDirect

Journal of Forensic and Legal Medicine

journal homepage: www.elsevier.com/locate/jflm

Clinical practice

Homicidal injuries during January and February, 2011 in Mansoura City, Egypt

Amal A. El-Bakary, PhD, Assistant Professor [a,*], Samira Sh. Hamed, PhD, Lecturer [a], Hesham Kh. Ismaeel, MD, Consultant [b]

[a] Forensic Medicine and Clinical Toxicology, Mansoura University, Egypt
[b] Critical Care in Emergency Hospital, Mansoura University, Egypt

ARTICLE INFO

Article history:
Received 8 March 2013
Accepted 27 April 2013
Available online 29 May 2013

Keywords:
Homicidal injuries
Trauma pattern
25th January Egyptian revolution

ABSTRACT

Studies dealing with analyzing cases of violence are very important, as these can be prevented to a high percentage. The aim of this study was to analyze the pattern of homicidal injuries compared to other causes of traumatic injuries in the population of Dakahlia province-Egypt during January and February, 2011 through reviewing cases' primary reports. In addition, the present work aimed to document traumatic injuries during the 25th January Egyptian revolution, 2011 in Mansoura City. Reports were reviewed for the available data including age, sex, residence as well as type, site, cause and mode of traumatic injuries. Out of 2270 cases' reports, 63.3% were from the Mansoura University Emergency hospital. Among the cases, 77.4% were males and 54.3% were from rural areas. Assaults (28%) were the 2nd leading cause of injuries preceded by road traffic accidents (29.8%). The commonest reported injuries due to assaults were cut wounds, contusions, firearm injuries and stab wounds while the commonest areas injured were the head, hands and chest. Assault injuries especially firearm injuries were more frequent during and shortly after revolution. Guns which are prohibited by law and other sharp and pointed instruments were freely used, a condition that is highly preventable by enforcing stringent laws.

1. Introduction

Studies dealing with analyzing cases of violence are very important, as these can be prevented to a high percentage. Injuries, unintentional or intentional, constitute a major public health problem. In the Eastern Mediterranean Region, more than 400,000 people die from injuries every year.[1]

Injury epidemiology and control remain under-researched and relatively neglected subject areas.[2] Reliable information on the event, type and nature of injuries and their outcomes is not available. One of the reasons is absence of a comprehensive national trauma data base.[3]

Data on trauma epidemiology vary between countries and even among different regions of a country.[4] This variance brings about differences in solutions and priorities as well. Therefore, different regional management methods are carried out.[5]

Tuesday the 25th of January is an enshrined date in Egypt. Despite being predominantly peaceful in nature, the revolution was not without violent clashes between security forces and protesters. Eighteen days later, Mubarak stepped down as a president and turned power over to the military Supreme Council of the Armed Forces.[6]

The aim of this study was to analyze the pattern of homicidal injuries compared to other causes of traumatic injuries in the population of Dakahlia province-Egypt during January and February, 2011. In addition, the present work aimed to document homicidal traumatic injuries during the 25th January Egyptian revolution, 2011 in the main medical centers of Mansoura City which are the biggest in the Delta region.

2. Subjects and methods

2.1. Study design

This observational retrospective cohort study was conducted to study hospital primary reports in the two main hospitals in Mansoura city; the Mansoura University Emergency Hospital (MUEH) and the Mansoura International Hospital (MIH). Each hospital receives emergency patients three days a week (in an alternating manner). Both are the main referral hospitals in middle and east delta region. MUEH serves not only trauma patients but also

* Corresponding author. Department of Forensic Medicine and Clinical Toxicology, Faculty of Medicine, Mansoura University, Mansoura 35511, Egypt. Fax: +20 002 050 2248203, +20 002 050 2248487.
E-mail address: amola_elbakary@yahoo.com (A.A. El-Bakary).

1752-928X/$ – see front matter
http://dx.doi.org/10.1016/j.jflm.2013.04.010

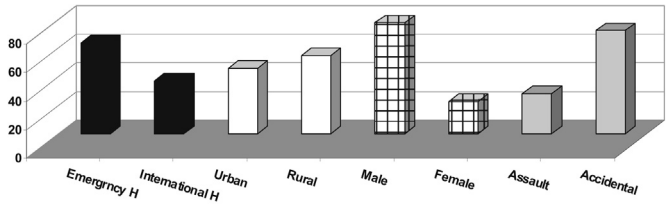

Fig. 1. Demographic data and patient's characteristics.

emergencies in surgery, medicine and poisoning while the MIH receives emergencies in all specialties.

The study period was from 1st January to 28th February (59 days), 2011. Throughout this period, 22,642 Emergency Department (ED) patients' visits were recorded in the MUEH and 19,860 ED patients' visits in the MIH. The reported injured cases in the MUEH represented 6.35% (1437 reports) of the total ED visits meanwhile, they represented 4.19% (833 reports) of the total ED visits in the MIH. Primary reports are usually written for cases that will be admitted or on the request of the patient e.g. if he wants to file a lawsuit.

The information was collected from primary reports that were reviewed for the available data including age, sex, residence of affected patients as well as type, site, cause and mode of traumatic injuries. To document injuries throughout the revolution, the visits 24 days before the 25th January Egyptian revolution and 17 days after Mubarak stepped down as a president, served as controls.

Ocular injuries were excluded as these cases were referred to the Mansoura University Ophthalmology Center; injuries due to burns and poisoning were also excluded.

2.2. Data processing and statistical analysis

The statistical analysis was performed using SPSS 17.0 for Windows software. Cross-tabulations of age groups by variables such as gender and type, site, cause and manner of injury were performed to provide greater insight into the determinants of these injuries. Also, cross-tabulations of cause of injury by the type and site of injuries were performed. Data were pooled to describe the burden of injuries by means of simple frequencies. Chi square was performed to compare the frequencies of different causes and most commonly reported types of assault injuries during the period of revolution compared to periods shortly before and after it. *P* value was significant if <0.05.

3. Results

All reported cases were 2270 cases, 63.3% of them were from the MUEH. Of them, 1758 (77.4%) were males, 1232 (54.3%) from rural areas and 1636 (72%) were non-intentional injuries. Males were involved in 84.9% of assaults (homicidal/intentional) injuries (Fig. 1). Age groups were listed in Table 1.

Table 1
Age groups in relation to sex.

Age groups	Sex {number (% within age group)}		Total
	Females	Males	
≤1 y	41 (39.1%)	63 (63.6%)	104 (4.6%)
1–10 y	96 (28.7%)	239 (71.3%)	235 (14.8%)
11–20 y	74 (17.1%)	360 (82.9%)	434 (19.1%)
21–30 y	90 (14.4%)	533 (85.6%)	623 (27.4%)
31–40 y	51 (17.2%)	246 (82.8%)	297 (13.1%)
41–50 y	65 (32.2%)	137 (67.8%)	202 (8.9%)
51–60 y	44 (30.6%)	100 (69.4%)	144 (6.3%)
>60 y	51 (38.9%)	80 (61.1%)	131 (5.8%)
Total	512 (22.6%)	1758 (77.4%)	2270 (100.0%)

Table 2
Types of injuries in different age groups (number and percentage within age group).

Age groups	Post-concussion *n* (%)	Internal hemorrhage *n* (%)	Bone fractures *n* (%)	Contusions *n* (%)	Abrasions *n* (%)	Cut wounds *n* (%)	Contused wounds *n* (%)	Stab wounds *n* (%)	Firearm injuries *n* (%)	Tendon tears *n* (%)	Amputation *n* (%)	Dislocation *n* (%)	Vascular injury *n* (%)	Surgical emphysema *n* (%)	Death *n* (%)
≤1 y	80 (76.9%)	11 (10.6%)	23 (22.1%)	2 (1.9%)	2 (1.9%)	6 (5.8%)	–	–	–	2 (1.9%)	–	–	–	–	–
1–10 y	164 (49.8%)	64 (19.1%)	151 (45.1%)	19 (5.7%)	3 (0.9%)	11 (3.3%)	10 (3.0%)	2 (0.6%)	1 (0.3%)	5 (1.5%)	–	1 (0.3%)	–	1 (0.3%)	–
11–20 y	90 (20.7%)	62 (14.3%)	205 (47.2%)	36 (8.3%)	12 (2.8%)	75 (17.3%)	29 (6.7%)	22 (5.1%)	19 (4.4%)	27 (6.2%)	2 (0.5%)	2 (0.5%)	10 (2.3%)	3 (0.7%)	–
21–30 y	95 (15.2%)	75 (12.0%)	236 (37.9%)	77 (12.4%)	36 (5.8%)	131 (21.0%)	35 (5.6%)	39 (6.3%)	44 (7.1%)	20 (3.2%)	4 (0.6%)	8 (1.3%)	11 (1.8%)	3 (0.5%)	2 (0.3%)
31–40 y	44 (14.8%)	30 (10.1%)	141 (47.5%)	30 (10.7%)	16 (5.4%)	54 (18.2%)	17 (5.7%)	9 (3.0%)	16 (5.4%)	15 (5.1%)	3 (1.0%)	2 (0.7%)	7 (2.4%)	4 (1.3%)	3 (1.0%)
41–50 y	42 (20.8%)	35 (17.3%)	119 (58.9%)	23 (11.4%)	11 (5.4%)	19 (9.4%)	12 (5.9%)	1 (0.5%)	4 (2.0%)	3 (1.5%)	–	2 (1.0%)	2 (1.0%)	–	1 (0.5%)
51–60 y	28 (19.4%)	16 (11.1%)	88 (61.1%)	22 (15.3%)	2 (1.4%)	14 (9.7%)	6 (4.2%)	2 (1.4%)	2 (1.4%)	3 (2.1%)	3 (2.1%)	2 (1.4%)	1 (0.7%)	1 (0.7%)	–
>60 y	13 (9.9%)	10 (7.6%)	103 (78.6%)	15 (11.5%)	3 (2.3%)	5 (3.8%)	4 (3.1%)	–	–	–	–	2 (1.5%)	–	1 (0.8%)	1 (0.8%)
Total	556 (24.5%)	303 (13.3%)	1066 (47.0%)	224 (9.9%)	85 (3.7%)	315 (13.9%)	113 (5.0%)	75 (3.3%)	86 (3.8%)	75 (3.3%)	12 (0.5%)	19 (0.8%)	31 (1.4%)	13 (0.6%)	7 (0.3%)

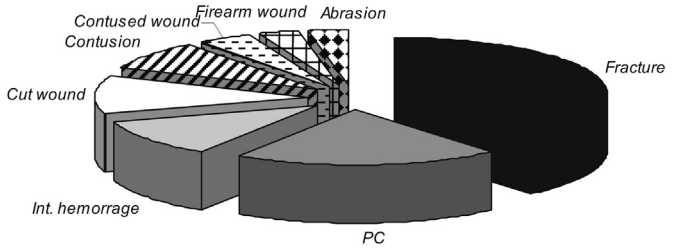

Fig. 2. A pie diagram showing the frequency of different forms of injuries.

The frequency of different types of injuries throughout the study period in different age groups was listed in Table 2 and Fig. 2 and the frequency of different body areas affection in different age groups was shown in Table 3 and Fig. 3.

The commonest reported cause of injuries was road traffic accidents (RTAs) (29.8%), then the assaults (28%) while the unspecified accidental causes of injuries represented 25.1% of recorded injuries (Table 4).

Table 5 showed the frequency of different types of injuries in comparison to the causes of injuries while, Table 6 showed the frequency of affected body areas in relation to the different causes of injuries. No suicidal traumatic injury was reported.

Reports were classified into three groups; before, during and after revolution and compared for cause, manner and the commonest homicidal (assault) injuries as shown in Table 7. Fig. 4 showed the total number of cases and the frequency of assault injuries blotted every 5 days in relation to revolution that was presented as zero point.

4. Discussion

While intentional injury is one of the leading causes of preventable injury,[7] assault resulting in serious injury and death is a priority concern for any society.[8] Although the risk for assault exists in all ethnic, racial and socioeconomic classes, certain demographic groups experience disproportionate rates of physical violence.[9]

The patient demographics in our registry are remarkably similar to the demographics of traumatically injured patients worldwide. Young males were over exposed to injuries, especially assault injuries as in Barcelona, Spain,[10] USA,[11] Malawi,[12] UK and Ireland[13] and Iran.[14]

In general, the most affected age group was the youth (11–30 y) constituting about 36.4% of cases. So, the most productive age will be affected by morbidity, disability or even mortality thus has a far greater economic impact. This result augments previous results in Egypt,[1] Spain[10] and Iran.[14] Reported cases were mostly from rural areas as Dakahlia governorate and neighboring governorates are mainly agricultural in nature.

Assault/homicidal injuries were found to be the 2nd leading cause of injuries as previously reported in a previous Egyptian study.[1] However, the frequency is increased from 18.6% in that study to 28% in the present study. This may be due to increased violence during and after the revolution and/or shortage of police during this period. In the same time, it is higher than some published data from a hospital-based registry in African developing countries as in Malawi (24.2%),[12] urban (3.4%) and rural (0.9%) Tanzania,[15] Ghana (5%)[16] and in USA (20.2%).[17] However, it is far lower than in a rural health center in Kenya (43%)[18] and in Turkey (63.2%).[19] The commonest reported injuries due to assaults were cut wounds (35.3%), contusions (20.0%), firearm injuries and stab wounds (12.4% and 11% respectively). High unemployment rates and low income are known to be factors that increase violence

Table 3
The frequency of affected body areas in different age groups (number and percentage within age group).

Age groups	Head *n* (%)	Abdomen *n* (%)	Chest *n* (%)	Pelvis *n* (%)	Thigh *n* (%)	Knee *n* (%)	Leg *n* (%)	Ankle *n* (%)	Foot *n* (%)	Shoulder *n* (%)	Arm *n* (%)	Fore-arm *n* (%)	Elbow *n* (%)	Wrist *n* (%)	Hand *n* (%)	Neck *n* (%)	Vertebral column *n* (%)	Back *n* (%)	All over body *n* (%)
≤1 y	91 (87.5%)	10 (9.6%)	1 (1.0%)	–	6 (5.8%)	–	2 (1.9%)	–	–	–	3 (2.9%)	3 (2.9%)	2 (1.9%)	–	–	–	–	–	–
1–10 y	240 (71.6%)	42 (12.5%)	7 (2.1%)	3 (0.9%)	28 (8.4%)	2 (0.6%)	5 (1.5%)	4 (1.2%)	6 (1.8%)	4 (1.2%)	15 (4.5%)	7 (2.1%)	17 (5.1%)	–	6 (1.8%)	3 (0.9%)	3 (0.9%)	1 (0.3%)	1 (0.3%)
11–20 y	207 (47.7%)	60 (13.8%)	38 (8.8%)	12 (2.8%)	46 (10.6%)	16 (3.7%)	36 (8.3%)	12 (2.8%)	14 (3.2%)	5 (1.2%)	15 (3.5%)	17 (3.9%)	9 (2.1%)	11 (2.5%)	51 (11.8%)	7 (1.6%)	15 (3.5%)	12 (2.8%)	–
21–30 y	265 (42.5%)	65 (10.4%)	65 (10.4%)	17 (2.7%)	64 (10.3%)	20 (3.2%)	60 (9.6%)	5 (0.8%)	21 (3.4%)	33 (5.3%)	25 (4.0%)	39 (6.3%)	10 (1.6%)	7 (1.1%)	79 (12.7%)	15 (2.4%)	21 (3.4%)	14 (2.2%)	1 (0.2%)
31–40 y	112 37.7%)	31 (10.4%)	34 (11.4%)	7 (2.4%)	21 (7.1%)	8 (2.7%)	36 (12.1%)	17 (5.7%)	9 (3.0%)	8 (2.7%)	9 (3.0%)	22 (7.4%)	8 (2.7%)	3 (1.0%)	39 (13.1%)	5 (1.7%)	9 (3.0%)	6 (2.0%)	1 (0.3%)
41–50 y	95 (47.0%)	21 (10.4%)	22 (10.9%)	8 (4.0%)	24 (11.9%)	6 (3.0%)	17 (8.4%)	3 (1.5%)	11 (5.4%)	4 (2.0%)	7 (3.5%)	15 (7.4%)	5 (2.5%)	3 (1.5%)	14 (6.9%)	2 (1.0%)	9 (4.5%)	3 (1.5%)	1 (0.5%)
51–60 y	52 (36.1%)	11 (7.6%)	12 (8.3%)	11 (7.6%)	24 (16.7%)	3 (2.1%)	15 (10.4%)	8 (5.6%)	5 (3.5%)	3 (2.1%)	4 (2.8%)	2 (1.4%)	3 (2.1%)	2 (1.4%)	8 (5.6%)	–	8 (5.6%)	10 (6.9%)	–
>60 y	34 (26.0%)	6 (4.6%)	9 (6.9%)	9 (6.9%)	61 (46.6%)	3 (2.3%)	5 (3.8%)	3 (2.3%)	1 (0.8%)	5 (3.8%)	7 (5.3%)	5 (3.8%)	1 (0.8%)	1 (0.8%)	4 (3.1%)	–	4 (3.1%)	–	–
Total	1096 (48.3%)	246 (10.8%)	188 (8.3%)	67 (3.0%)	274 (12.1%)	58 (2.6%)	176 (7.8%)	52 (2.3%)	67 (3.0%)	62 (2.7%)	85 (3.7%)	110 (4.8%)	55 (2.4%)	27 (1.2%)	201 (8.9%)	32 (1.4%)	69 (3.0%)	46 (2.0%)	4 (0.2%)

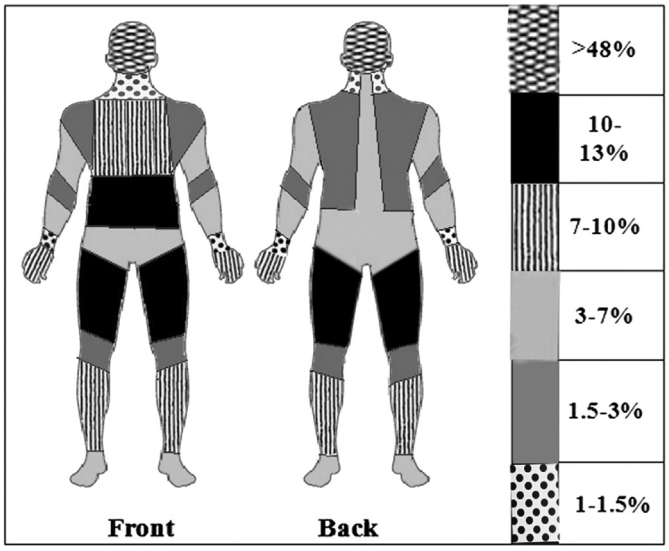

Fig. 3. Frequency of injuries in different body areas.

among people. Another cause of the high assault rate in our study might be the patient's intention to file a lawsuit.

The present study showed that assaults were the 1st leading cause of injury in patients aged 21–30 y while RTAs are the 1st leading cause of injury in patients aged 11–20 y and 31–50 y and falls were the 1st leading cause of injury in children ≤1–10 y. On the other hand, most cases aged >50 y have unspecified accidental cause of injury. Cause of injury was unspecified accidental for about 1/4 of recorded injuries that is mostly due to activity of daily life. A limitation of this study is the poor information observed in reports including detailed description of injuries, its site and manner. For improving the recording of injuries, data needs to be prioritized in the Egyptian emergency departments in conjunction with the development of a national injury surveillance system.

In consistent with previous reports,[10,12,14,20] the 1st leading cause of injury was RTAs (29.8%) although frequency may differ. However, RTAs were reported to be 2nd or 3rd most common cause of injuries following assaults[19] or following falls[10,21] or following falls and penetrating/gunshot injury.[22] In Egypt, injuries due to RTAs are increasing.[1] In their report, RTAs were the 3rd leading cause of injury preceded by falls and assaults. To overcome the problem of RTAs, road safety measures must be fulfilled e.g. improved driver training, road design and maintenance, lighting, regular vehicle safety checks and separation of pedestrians from vehicle traffic.[2]

Another interesting finding in the present study is the absence of any reported suicidal attempt. In Western countries, the frequency of suicidal acts is reported as 1.1–14% while in Turkey, an Islamic country, it was as low as 0.4%.[19] One of the reasons of absence of reported suicidal cases in the present study is the short duration of the study period. Another cause is the relatively low incidence (although increasing) of suicidal attempts in Islamic countries[23] and that suicidal attempt through self poisoning is relatively more common.[24,25] Work and train injuries in the present study were uncommon.

In this report, fractures (47%) were the commonest injuries followed by post concussion (24.5%), internal hemorrhage (13.3%) and cut wounds (13.9%). The high incidence of fractures put our hands on the fact that youth become disabled limiting their production thus has a far greater economic impact. This is consistent with previous observations from a Nigerian center although prevalence varies.[20] But in other reports, contusions and abrasions were the commonest (31.9%) followed by lacerations (30.6%) while fractures were 14.3%.[12]

Post-concussion was commonest in children ≤1–10 y as fall is the commonest cause of injury in this age group. Herein firearm injuries represented 3.8% of cases. This is far higher than reported in the United States in 2009 (less than 1%),[26] in Nigeria (0.6%),[20] in a Turkish study (1.3%)[19] and the reported prevalence (0.2–2.7%).[17] This high incidence may be in part due to the use of non-rifled weapons (mostly by policemen) that releases shots affecting many persons by a single shooting. Also firearm weapons were more commonly used during and after revolution.

Reported dead cases at or shortly after presentation were 0.3%. This is relatively lower than reported range of 0.5%–6% worldwide.[20] This may be due to shortage of data available on the fate of reported cases as only cases that presented died or that died shortly after presentation were included in the study. This is one drawback of our approach. We therefore recommend that hospital-based surveillance efforts should include not only prospective data collection in the casualty department (to inform primary and secondary intervention efforts), but also data collection on hospital care and outcomes of admitted patients. This approach would provide a comprehensive overview of injury informing primary, secondary and tertiary prevention, which is possible only when both casualty department data and outcome data are combined. However, as in other reports,[14,19] assaults and RTAs were the main causes of death.

In the present study, the commonest areas injured in assault injuries were the head (38.3%), hands (14%) and chest (10.3%). Head is the most accessible. Also assailants usually direct trauma to an area that induces fatal injuries as the head and chest. Hands are usually used in defense actions and hence more traumatized.

Table 4
Causes of injury in relation to different age groups (number and percentage within age group).

Age groups (year)	Causes of injury						Total *n* (%)
	RTAs *n* (%)	Fall *n* (%)	Work *n* (%)	Train *n* (%)	Assault *n* (%)	Accidental unspecified causes *n* (%)	
≤1	10 (9.6)	52 (50.0)	–	–	5 (4.8)	37 (35.6)	104 (100)
1–10	82 (24.5)	131 (39.1)	–	–	6 (1.8)	116 (34.6)	335 (100)
11–20	153 (35.3)	59 (13.6)	–	1 (0.2)	138 (31.8)	83 (19.1)	434 (100)
21–30	175 (28.1)	50 (8.0)	6 (1.0)	–	296 (47.5)	96 (15.4)	623 (100)
31–40	109 (36.7)	21 (7.0)	3 (1.0)	–	99 (33.3)	65 (21.9)	297 (100)
41–50	78 (38.6)	29 (14.4)	1 (0.5)	–	49 (24.3)	45 (22.3)	202 (100)
51–60	46 (31.9)	16 (11.1)	–	3 (2.1)	29 (20.1)	50 (34.7)	144 (100)
>60	26 (19.8)	10 (9.7)	–	–	13 (9.9)	82 (62.6)	131 (100)
Total	677 (29.8)	368 (16.2)	10 (0.4)	4 (0.2)	635 (28)	570 (25.1)	2270 (100)

Table 5
The frequency of different types of injuries in comparison to causes of these injuries (number and percentage within the cause).

Causes	Post-concussion *n* (%)	Internal hemorrhage *n* (%)	Bone fractures *n* (%)	Contusions *n* (%)	Abrasions *n* (%)	Cut wounds *n* (%)	Contused wounds *n* (%)	Stab wounds *n* (%)	Firearm injuries *n* (%)	Tendon tears *n* (%)	Amputation *n* (%)	Dis-location *n* (%)	Vascular injury *n* (%)	Surgical emphysema *n* (%)	Death *n* (%)
RTAs	200 (21.3%)	138 (14.7%)	424 (45.1%)	50 (5.3%)	14 (1.5%)	48 (5.1%)	36 (3.8%)	–	–	10 (1%)	1 (0.1%)	5 (0.5%)	5 (0.5%)	6 (0.6%)	3 (0.3%)
Fall	163 (33.2%)	90 (18.3%)	196 (39.9%)	16 (3.3%)	2 (0.4%)	7 (1.4%)	12 (2.44%)	–	–	3 (0.6%)	–	1 (0.2%)	1 (0.2%)	–	–
Work	–	–	5 (50.0%)	–	–	2 (20.5%)	–	–	–	2 (20.0%)	2 (20.0%)	–	1 (10.0%)	–	–
Train	–	–	2 (50.0%)	–	–	–	2 (50.0%)	–	–	2 (50.0%)	2 (50.0%)	–	1 (25.0%)	–	–
Assault	44 (6.9%)	28 (4.4%)	80 (12.6%)	127 (20.0%)	66 (10.4%)	224 (35.3%)	38 (8.0%)	70 (11.0%)	79 (12.4%)	38 (8.0%)	2 (0.3%)	8 (1.3%)	19 (3.0%)	7 (1.1%)	3 (0.5%)
Non-specified	149 (26.8%)	75 (27.3%)	389 (33.7%)	31 (32%)	3 (15.8%)	34 (37.4%)	25 (33.3%)	0 (0.0%)	0 (0.0%)	20 (54.1%)	5 (50.0%)	5 (45.5%)	4 (33.3%)	0 (0.0%)	1 (25.0%)
Total	556 (24.5%)	303 (13.3%)	1066 (47.0%)	224 (9.9%)	85 (3.7%)	315 (13.9%)	113 (5.0%)	75 (3.3%)	83 (3.7%)	75 (3.3%)	12 (0.5%)	19 (0.8%)	31 (1.4%)	13 (0.6%)	7 (0.3%)

Table 6
The frequency of affected body areas in relation to different causes of injuries (number and percentage within the cause).

Cause	Head *n* (%)	Abdomen *n* (%)	Chest *n* (%)	Pelvis *n* (%)	Thigh *n* (%)	Knee *n* (%)	Leg *n* (%)	Ankle *n* (%)	Foot *n* (%)	Shoulder *n* (%)	Arm *n* (%)	Fore-arm *n* (%)	Elbow *n* (%)	Wrist *n* (%)	Hand *n* (%)	Neck *n* (%)	Vertebral column *n* (%)	Back *n* (%)	All over body *n* (%)
RTAs	356 (36.4%)	109 (11.2%)	81 (8.3%)	33 (3.4%)	98 (10.0%)	29 (3.0%)	97 (10.0%)	11 (1.1%)	20 (2.0%)	15 (1.6%)	33 (3.4%)	29 (3.0%)	10 (1.0%)	3 (0.3%)	25 (2.6%)	3 (0.3%)	17 (1.8%)	8 (0.8%)	–
Fall	254 (52.6%)	58 (12.0%)	14 (2.9%)	17 (3.5%)	32 (6.6%)	2 (0.4%)	12 (2.5%)	11 (2.3%)	3 (0.6%)	8 (1.6%)	7 (1.4%)	14 (2.9%)	6 (1.2%)	2 (0.4%)	5 (1.0%)	2 (0.4%)	30 (6.2%)	6 (1.2%)	–
Work	1 (10.0%)	–	–	–	–	–	1 (10.0%)	–	1 (10.0%)	–	–	–	–	1 (10.0%)	6 (60.0%)	–	–	–	–
Train	–	–	–	–	–	–	1 (25.0%)	–	2 (50.0%)	–	–	–	–	1 (25.0%)	–	–	–	–	–
Assault	298 (38.3%)	35 (4.5%)	80 (10.3%)	–	36 (4.6%)	18 (2.3%)	36 (4.6%)	4 (0.5%)	18 (2.3%)	26 (3.3%)	21 (2.7%)	44 (5.6%)	16 (2.1%)	11 (1.4%)	109 (14.0%)	24 (3.1%)	3 (0.4%)	–	–
Non-specified	187 (41.0%)	44 (6.5%)	13 (8.1%)	17 (1.4%)	108 (11.9%)	27 (2.2%)	31 (5.4%)	26 (2.5%)	23 (3.4%)	13 (3.2%)	24 (3.7%)	30 (5.5%)	23 (3.2%)	9 (1.7%)	56 (13.6%)	3 (2.2%)	19 (1.8%)	32 (2.6%)	4 (0.3%)
Total	1096 (48.3%)	246 (10.8%)	188 (8.3%)	67 (3.0%)	274 (12.1%)	58 (2.6%)	178 (7.8%)	52 (2.3%)	67 (3.0%)	62 (2.7%)	85 (3.7%)	110 (4.8%)	55 (2.4%)	27 (1.2%)	201 (8.9%)	32 (1.4%)	69 (3.0%)	46 (2.0%)	4 (0.4%)

Table 7
Comparison between different groups (before, during and after revolution).

Item	Groups			Chi square test	
	Before revolution ($n = 903$)	During revolution ($n = 745$)	After revolution ($n = 622$)	t_1	t_2
Causes of injury:					
RTAs.	290 (32.1%)	197 (26.4%)	190 (30.5%)	0.01*	0.10
Fall.	146 (16.2%)	124 (16.6%)	98 (15.8%)	0.87	0.74
Work.	6 (0.7%)	1 (0.1%)	3 (0.5%)	0.13	0.38
Train.	4 (0.4%)	0 (0.0%)	0 (0.0%)	0.23	–
Manner of injury:					
Homicidal (assaults).	204 (22.6%)	234 (31.4%)	197 (31.7%)	0.001**	0.95
Accidental/non-specified.	253 (28.0%)	189 (25.4%)	134 (21.5%)	0.25	0.10
Type of injury:					
Cut wounds.	123 (13.6%)	94 (12.6%)	98 (15.8%)	0.59	0.10
Contusions.	95 (10.5%)	72 (9.7%)	57 (9.2%)	0.65	0.82
Firearm injuries.	5 (0.6%)	56 (7.5%)	25 (4.0%)	0.001**	0.01*
Stab wounds.	26 (2.9%)	24 (3.2%)	25 (4.0%)	0.83	0.51

t_1: comparison between before revolution to during revolution. t_2: comparison between after revolution to during revolution. RTAs.: road traffic accidents. * Highly significant. ** Very highly significant.

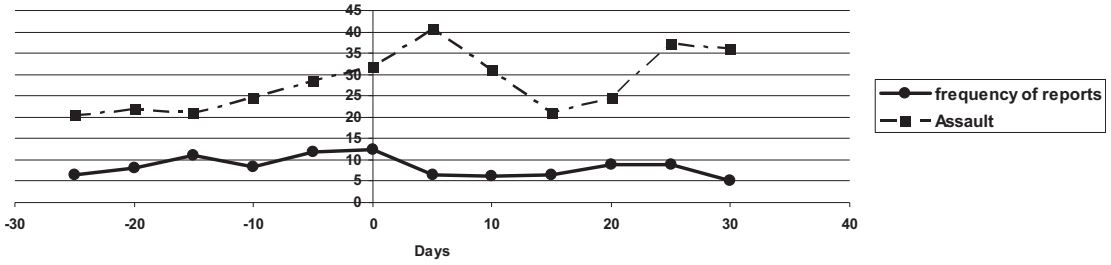

Fig. 4. The frequency of reports and assault injuries during the study period in relation to revolution (zero line).

Generally, head affection (48.3%) over-numbered other areas injured followed by thighs (12.1%) and abdomen (10.8%). Head and neck were reported as the commonest area affected,[19] but extremities were reported to be the most common body regions injured in other reports.[20,22] On the other hand, thigh affection is the commonest region in patients >60 y mostly due to fracture neck femur as evidenced by high incidence of fractures in this age group. Hands were the commonest area affected in work injuries, while feet were commonly affected in train injuries.

As expected, the frequency of assault injuries increased significantly during and after revolution. While firearm injuries were significantly increased during and after revolution, stab wounds were none significantly increased during such periods but cut wounds and contusions were fluctuating.

An interesting finding is the significant decrease in the frequency of RTAs during revolution compared to periods shortly before it. Meanwhile it was none significantly lower than the period shortly after it. During revolution many protesters were in the main squares in large cities interfering with traffic meanwhile many persons were in their houses fearing from violence. During such period, it was the midyear holiday of university and school students. Similarly, work injuries were not reported during and after revolution through the study period as many factories were out of work and many workers were sharing in the revolution. Also, train injuries were not reported during and after revolution through the study period. Due to the previous mentioned causes, the frequency of non-specified accidental injuries was none significantly lower during and after revolution.

Sarhan et al.[27] reported that 3012 casualties were received at "Kasr El-Ainy" Cairo University Hospital, the largest hospital in the Middle East and the tertiary referral center for all hospitals that happened to be the closest to Tahrir Square between January 28, 2011, and February 4, 2011. On arrival, 453 patients needed surgical intervention within 6 h of arrival whereas 74 of patients were managed conservatively. Forty patients did not survive their injuries.

Shokry[28] documented that about 52% of injuries received at "Kasr El-Ainy" during the revolution were firearm injuries. As data presented in our work excluded ophthalmic injuries that were mostly firearm, the incidence of firearm injuries in the present study is far lower than that in Cairo.

It must be noted that, during such periods, hospital emergency departments provide treatment to victims of revolution injuries (or any other huge event) as well as to routine patient admissions around the clock. Periods of high ED crowding are associated with increased inpatient mortality and modest increases in length of stay and costs for admitted patients.[29] This requires special deployment by the hospitals to optimize the utilization of their resources. These findings can help in future planning and optimization of the use of human and other resources during periods of crisis.

5. Conclusion

In view of the above finding, it is apt to conclude that homicidal/assault injuries are important public health hazards as these injuries were the 2nd commonest cause of injuries and a leading cause of death. Guns which are prohibited by law and other sharp and pointed instruments were freely used as the commonest reported injuries due to assaults were cut wounds, firearm injuries and stab wounds. This condition can be prevented by enforcing stringent laws and focus social prevention strategies on young adults, and particularly men.

Our results concluded that assault injuries especially firearm injuries were more frequent during and after revolution. A better understanding of the nature of these assaults is crucial to

addressing this problem and will be a focus of future research. Due to exploitation of the ED by non-traumatic patients, planning and optimization of the use of human and other resources is mandatory to achieve good and time oriented service for severely injured traumatic patients.

Ethical approval

This study followed the ethical guidelines of ethical committee of Mansoura University.

Funding

None.

Conflict of interest

Neither the author nor any of the coauthors have any potential conflict of interests related to the publication of this paper.

References

1. Egypt*WHO injury surveillance: a tool for decision-making annual injury surveillance report* 2009.
2. Nordberg E. Injuries as a public health problem in sub-Saharan Africa: epidemiology and prospects for control. *East Afr Med J* 2000;**77**:1–43.
3. Ghaffar A, Hyder AA, Masud TI. The burden of road traffic injuries in developing countries: the 1st national injury survey of Pakistan. *Public Health* 2004;**118**: 211–7.
4. Dessypris N, Dikalioti SK, Skalkidis I, Sergentanis TN, Terzidis A, Petridou ET. Combating unintentional injury in the United States: lessons learned from the ICD-10 classification period. *J Trauma* 2009;**66**:519–25.
5. Helling TS. Trauma care at rural level III trauma centers in a state trauma system. *J Trauma* 2007;**62**:498–503.
6. Abdallah NA. Biotech crops and the Egyptian revolution: where we stand. *Biotech Agric Food Chain* 2011;**2**(2):83–4.
7. Gal M, Rus D, Peek-Asa C, Cherecheş RM, Sirlincan EO, Boeriu C, et al. Epidemiology of assault and self-harm injuries treated in a large Romanian emergency department. *Eur J Emerg Med* 2012;**19**(3):146–52.
8. Wellington NZ. *Children at increased risk of death from maltreatment and strategies for prevention*. Ministry of Social Development; 200651.
9. Norris FH. Epidemiology of trauma: frequency and impact of different potentially traumatic events on different demographic events. *J Consult Clin Psychol* 1992;**60**:409–18.
10. Plasència A, Borrell C. Population-based study of emergency department admissions and deaths from injuries in Barcelona, Spain: incidence, causes and severity. *Eur J Epidemiol* 1996;**12**(6):601–10.
11. Clark D, Fantus R. *American College of Surgeons Committee on Trauma, National trauma data bank annual report* 2007.
12. Samuel JC, Akinkuotu A, Villaveces A, Charles AG, Lee CL, Hoffman IF, et al. Epidemiology of injuries at a tertiary care center in Malawi. *World J Surg* 2009;**33**(9):1836–41.
13. Alexandrescu R, O'Brien SJ, Lecky FE. A review of injury epidemiology in the UK and Europe: some methodological considerations in constructing rates. *BMC Public Health* 2009;**9**:226.
14. Rasouli MR, Saadat S, Haddadi M, Gooya MM, Afsari M, Rahimi-Movaghar V. Epidemiology of injuries and poisonings in emergency departments in Iran. *Public Health* 2011;**125**(10):727–33.
15. Moshiro C, Heuch I, Astrom A, Setel P, Hemed Y, Kvåle G. Injury epidemiology in an urban and a rural area in Tanzania: an epidemiological survey. *BMC Public Health* 2005;**5**:1–10.
16. Mock C, Adzotor E, Denno D, Conklin E, Rivara F. Admissions for injury at a rural hospital in Ghana: implications for prevention in the developing world. *Am J Public Health* 1995;**85**:927–31.
17. Vyrostek SB, Annest JL, Ryan GW. Surveillance for fatal and nonfatal injuries–United States, 2001. *MMWR Surveill Summ* 2004;**53**:1–57.
18. Ranney ML, Odero W, Mello MJ, Waxman M, Fife RS. Injuries from interpersonal violence presenting to a rural health center in Western Kenya: characteristics and correlates. *Inj Prev* 2009;**15**:36–40.
19. Kahramansoy N, Erkol H, Kurt F, Gürbüz N, Bozgeyik M, Kiyan A. Analysis of trauma patients in a rural hospital in Turkey. *Turkish J Trauma Emerg Surg* 2011;**17**(3):231–7.
20. Thanni LOA, Kehinde OA. Trauma at a Nigerian teaching hospital: pattern and documentation of presentation. *Afr Health Sci* 2006;**6**(2):104–7.
21. Spiller HA, Singleton MD. Comparison of incidence of hospital utilization for poisoning and other injury types. *Public Health Rep* 2011;**126**(1):94–9.
22. Musharrafieh U, Rahi AC, Taha A, Shamseddine W, Steitieh S, Jamali F, et al. Profile of injured patients presenting to a tertiary hospital in a developing country. *J Med Liban* 2011;**59**(4):191–206.
23. *WHO Suicide prevention* (*SUPRE*) http://www.who.int/mental_ health/prevention/suicide/suicideprevent/en/, [accessed 28.02.12].
24. Doshi A, Boudreaux ED, Wang N, Pelletier AJ, Camargo Jr CA. National study of US emergency department visits for attempted suicide and self-inflicted injury, 1997–2001. *Ann Emerg Med* 2005;**46**(4):369–75.
25. Lee CA, Choi SC, Jung KY, Cho SH, Lim KY, Pai KS, et al. Characteristics of patients who visit the emergency department with self-inflicted injury. *J Korean Med Sci* 2012;**27**(3):307–12.
26. *Web-based Injury Statistics Query and Reporting System* (*WISQARS*) *Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC; NEISS All Injury Program operated by the Consumer Product Safety Commission* (*CPSC*). Available at: http://www.cdc.gov/injury/wisqars/index.html, [accessed 20.06.12].
27. Sarhan MD, Dahaba AA, Marco M, Salah A. Mass casualties in Tahrir Square at the climax of the Egyptian uprising: evidence of an emerging pattern of regime's organized escalating violence during 10 hours on the night of January 28, 2011. *Ann Surg* 2012. [Epub ahead of print].
28. Shokry DA. Forensic eye on revolution cases admitted to Kasr Alainy. In: *Conference: "Egyptian revolution: January, 2011" forensic view* 2011. Abstract.
29. Sun BC, Hsia RY, Weiss RE, Zingmond D, Liang L, Han W, et al. Effect of emergency department crowding on outcomes of admitted patients. *Ann Emerg Med* 2012. http://dx.doi.org/10.1016/j.annemergmed.2012.10.026.